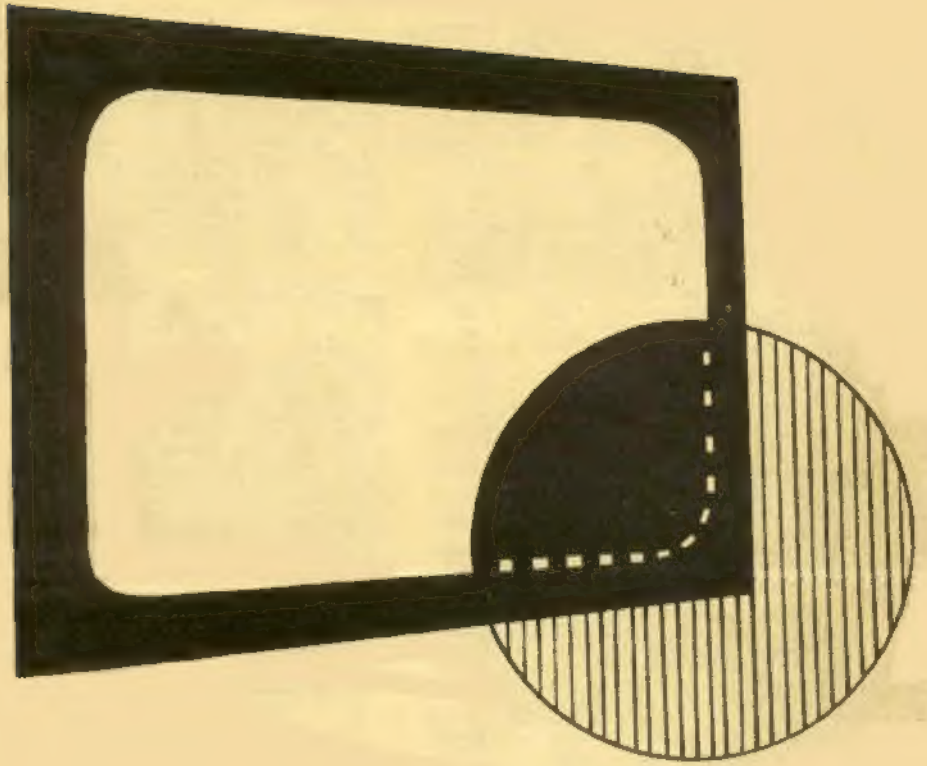

cq-tv

December 1954

At least five shillings per annum.

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Number Twenty-Three.

Sixth Year.

The British Amateur Television Club is affiliated to the Radio Society of Great Britain.

Edition Twenty-Three brings us to the end of 1954, and the introduction of the Hon. Treasurer's labour-saving idea of making all subscriptions renewable on January 1st. We must thank all those members who have so kindly sent in P.Os and cheques for odd sums to make up their subscriptions to the end of a year. Please note, therefore, that

ALL SUBSCRIPTIONS ARE RENEWABLE WITH THIS ISSUE,

and that

NO FURTHER REMINDERS WILL BE SENT.

We are sorry not to be able to continue the present scheme of First and Second Reminders, but on grounds of economy this cannot be done. If, therefore, by May or so you realise that you have not yet had No. 24, please check with the Hon Treasurer G3ZKS at 307, Norbury Avenue, London SW16, that in fact your subscription was received. In view of postal delays, overseas members will receive No. 24 even if their subscription has not been received. In this connection, may we point out that cheques and postal orders should be made payable to "The British Amateur Television Club", and crossed. Since the Club has a Bank account, it is not necessary to state any Post Office on P.Os or International Money Orders.

Those members who, for one reason or another, are not yet in step, will receive a subscription reminder with the pertinent edition, upon which will be the exhortation to include sufficient to cover you to the end of a year. When sending in odd amounts, please indicate clearly just what this sum is for.

"Practical Television" very kindly included a note on the BATC's activities, and the resulting new members have enabled us to print a 10 page edition this time. However, as the new subscription payment scheme may clear a few cobwebs, it may not be possible to keep this up, and we shall be back to the 8 page editions. The alternative, suggested by members, is to increase the subscription to 7/6 or even 10/-. This we are naturally loth to do, but on the other hand the subscriptions at the moment only just cover the cost of the magazine in its new style, and other Club services, such as the film, tape, test card and lecture arrangements have not been able to expand to an economical degree. Members can help by enrolling new members where they can; if not, at the end of the year it may be necessary to increase the subscription slightly.

Bradford and Manchester

Following our plea for volunteers to organise activities in various areas, we are very pleased to announce that two members have offered their help and enthusiastic co-operation. In BRADFORD, Al Bevington, G3KKS, of 285, Poplar Grove, Gt. Horton, Bradford 7, wants to hold meetings in his newly built garden bungalow-cum-TV studio. He has a 5527 camera working, a tx under way, a tape recorder, and an MSS disc recorder. He adds that his wife makes excellent tea. In MANCHESTER, G.Higgins of 9, Cavendish Rd, Chorlton-cum-Hardy wants to organise meetings in the area. He has some equipment available. Will all members in these areas interested in holding a meeting please contact Messrs Bevington or Higgins directly. In both areas there are numbers of members, and also good sources of good lectures on TV and ATV subjects.

Standards:

Useful comments have been received from various members, and also from Club meetings where the BATC proposed standards have been discussed. Some uneasiness is felt at the proposal to use a Central Battery system for interoom purposes, since if the operators' headsets and microphones are of different impedances some of them will work very well, and the others not at all. G3AKJ and the other GPO members are giving this further thought.

So, dear friends and fellow licence-dodgers (?), may I wish you personally a Very Happy Christmas, a prosperous New Year - and may you get that Station in 1955!

Yours sincerely,

lysd

"CQ-TV" is published for the British Amateur Television Club at 10, Baddow Place Avenue, Great Baddow, Nr. Chelmsford, Essex, and appears quarterly.

R.S.G.B. EXHIBITION 1954

The Club did not have a Stand at this year's RSGB Exhibition, but two of our better cameras were on display, doing great credit to Amateur Television in general. G2WJ/T was there, and so was Ian Waters, both with complete camera chains. In addition, Mr. Attew, a friend of Ian's, displayed a very fine Monoscope unit (Test Card F - cubes and radiating lines). A detailed description follows.

At the back of the control desk, against a wall, were (from right to left) a mains inlet control board, with variac and huge voltmeter, Distribution Rack (for feeding vision out at 45 Mc/s), camera control rack, including all the necessary gear for generating a 405 line picture, shading generators, etc, and a 9" picture monitor, and 3" TV CRO. All this gear belongs to Ian Waters, BRS 17908.

A 17" Pye VT17 13 channel domestic TV set was next in line, and then G2WJ's CRO monitoring the waveform. A 9" monitor switchable to RF, Line or BBC, and the other camera control rack completed the layout. The outputs from the two CCUs (at BATC standard level AND on Belling Lee sockets!) were fed into the vision mixer panel. This had 5 100 ohm potentiometers for mixing or fading, but no cut buttons, so that all mixing had to be done on the faders. Cue light switches were fitted, but had to be operated by the "Producer" - a duty sometimes overlooked. The output from the mixer, which had 2 12AT7s to give necessary amplification and phase inversion, went to the modulator of the 70 cm tx, which is complete and self-contained in a 4' rack. This was feeding a dummy load, and a small probe abstracted some energy to feed the 70 cm converter. This uses an ex-RAF 105 oscillator with a CV55, and gives out 45Mc/s, which was passed, via an RF distribution box, to the two Pye receivers, one in the main hall, and one mentioned above on the stand.

Mr. Attew's monoscope unit consisted of three suit-case type of boxes, containing Monoscope, monitor, and Line Strobe waveform monitor, and another case containing the power supplies. Unfortunately it was not possible to run all three picture sources simultaneously due to mains trouble, but any two worked very nicely together. In general, the public could see the two pictures on the two CCUs as "preview" and the 17" Pye set carried "transmission". Note that the transmitted picture went through the complete chain: camera - CCU - vision mixer - modulator - transmitter - converter - TV set. Most of the time, especially with G2WJ's new tube, pictures were really first class.

Production:

Originally only G2WJ's camera was to be on show, but Ian kindly volunteered his as a standby, and it was decided to take advantage of this and run two cameras. In point of fact, of course, a lot of the equipment was unnecessarily duplicated (sync generator and distribution amplifiers, etc) but this certainly made for less sleepless nights for the operators.

During daylight, Ian's camera was placed in the foyer of the Royal Cafe, televising street scenes, whilst the other camera was used in the hall for studio spots, interviews, etc. On the first few days several BATC members kindly gave assistance in acting as camera crews, but even so staff shortages caused some difficulty. In general two camera operators, two rack operators and a Vision Mixer were required, and this was really only possible on the Saturday. Even so, some good shows were put on, although the mass of equipment there seemed to scare off the casual enquirers!

This being the first show of its kind where two cameras of roughly equal capabilities and proper vision mixing facilities were available, several points occurred which will be of interest to others thinking in similar terms. Firstly, the use of standard outputs and fittings was a great help. All the gear was assembled and tested together several days before the show opened. The cueing facilities were inadequate, due to lack of time. Each rack operator could talk to his own camera, but could neither talk to nor hear the producer. Since normal headphones were worn, it was not usually possible to shout sufficiently loudly to attract attention, and it was occasionally necessary for the producer to have a runner to tap the rack operator on the shoulder to relay instructions to the cameraman. This could easily be overcome by giving the producer a microphone and headset tied into the rest of the headset circuits. The vision mixer cue switches mentioned above did not operate through to the cameras, but only to the racks, it being left to the rack operator to cue the camera. This also is being attended to. Lack of a fast cut between pictures was a little inconvenient, not too noticeable to the writer's eye, but causing acute pain to a professional visitor standing with his at the time. The microphone in the studio is always a sore point; if it is omni-directional it usually causes feedback with the hall speakers, and if it is not it must either be close to the "actors" or have an extra operator. The physical size of the microphone and its stand, and the limited area over which it will pick up sound, make one think that an overhead boom with a directional microphone pointing into the ge general acting area is probably the best answer. We hope to have a new one built by next year.

Neither camera had a lens change, nor could either be tracked in and out, except by brute force. A set of "Cascoigne" giant castors for G2WJ's camera just missed the show, whilst Ian's rather long dolly (pram-wheel variety) was omitted because of lack of space. With castors, of course, it is difficult to dolly-in in a straight line. In actual fact, with two cameras it was always possible to move about without too much trouble. One snag that keeps repeating at the RSGB Exhibition is the raised "studio" floor, a stage. Neither camera could be raised any appreciable amount, so that all shots were necessarily at tummy level. Whilst a simple crane seems rather a stiff proposition, some extension of tripod heads

(Continued at foot of Page Eight).

MEASURING DELAY LINE CHARACTERISTICS

Many readers will have odd delay lines in their junk boxes, probably salvaged from surplus radar gear, and may have wondered whether they could be put to good use in the TV transmitter. Their general appearance is as in Figure 1.

A series of identical coils are wound in single pies on a common former; they are all joined in series, and from all junctions a condenser goes to a common busbar. The end condensers will normally be of half the value of the others, and the end coils may be slightly smaller than the rest. One or both ends may be bridged with a resistor, or one end may be short-circuited.

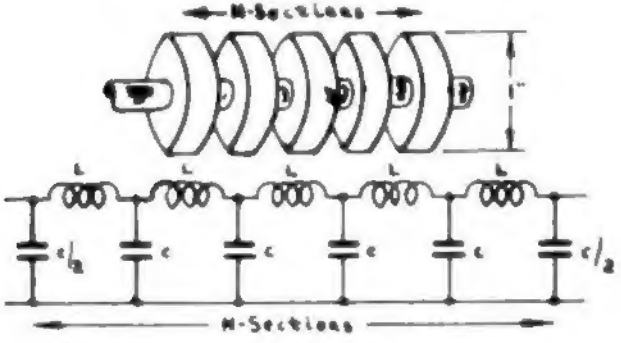


Figure 1: Typical delay line, and circuit.

A delay line, as its name implies, has the property that it will delay any pulse fed into it, and acts as a transmission line with a very low velocity factor. The relevant formulae for the delay introduced per L-C section are:

$$t = 1.1 \times 10^{-3}\sqrt{LC}$$

$$Z_o = 1100\sqrt{\frac{L}{C}}$$

where t is the delay per section in microseconds; L,C are in μH and pF, Z_o is the characteristic impedance in ohms.

In addition, the frequency response of the line depends on the number of sections, being better the larger the number of sections. Thus a 2 section line will distort a pulse much more than a 10 section line for a given impedance and delay.

The characteristic impedance of the delay line just as for any transmission line, is the impedance seen at the input due to an infinitely long length of the line. Put another way, if a short length of transmission line is terminated in an impedance equal to its characteristic impedance, it will appear to be infinitely long. Pulses fed in at the input will not then be reflected back at the termination. If deliberate mismatching is introduced, a reflection will occur at the termination, and a pulse fed in at the input will re-appear:

Deliberate mismatching causes a reflection, and if a pulse is fed in, its reflection will appear at the input after time 2T, i.e twice the delay of the whole line. If the input is also incorrectly matched, a further reflection will occur, and it is possible to obtain a series of diminishing echoes. The three most commonly used modes of line operation are shown in Figure 2. Note that the delay between corresponding edges of the pulses is equal to T at the output and to 2T at the input. If the pulse width is longer than the delay time, the waveforms of Fig 2 b and c will become:

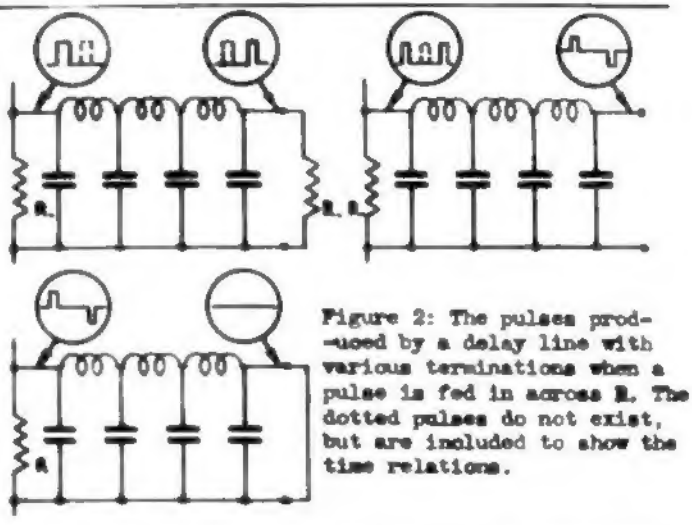


Figure 2: The pulses produced by a delay line with various terminations when a pulse is fed in across R. The dotted pulses do not exist, but are included to show the time relations.

The average amateur does not possess facilities for measuring inductance and capacity accurately, and it is possible that any resistor already soldered across the end of the line may not in fact be the correct terminating resistance. Given a completely unknown line, it is fortunately a very simple matter to measure T and Z_o directly. The method is shown in Figure 3.

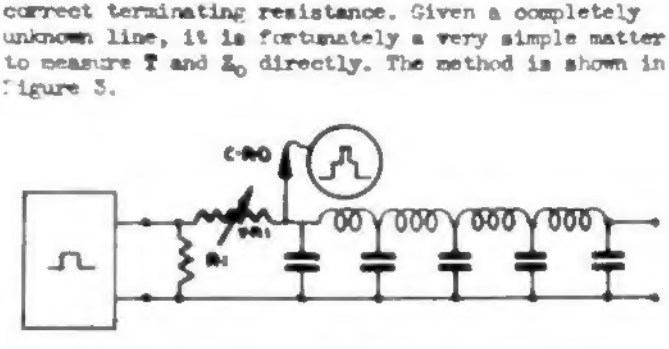
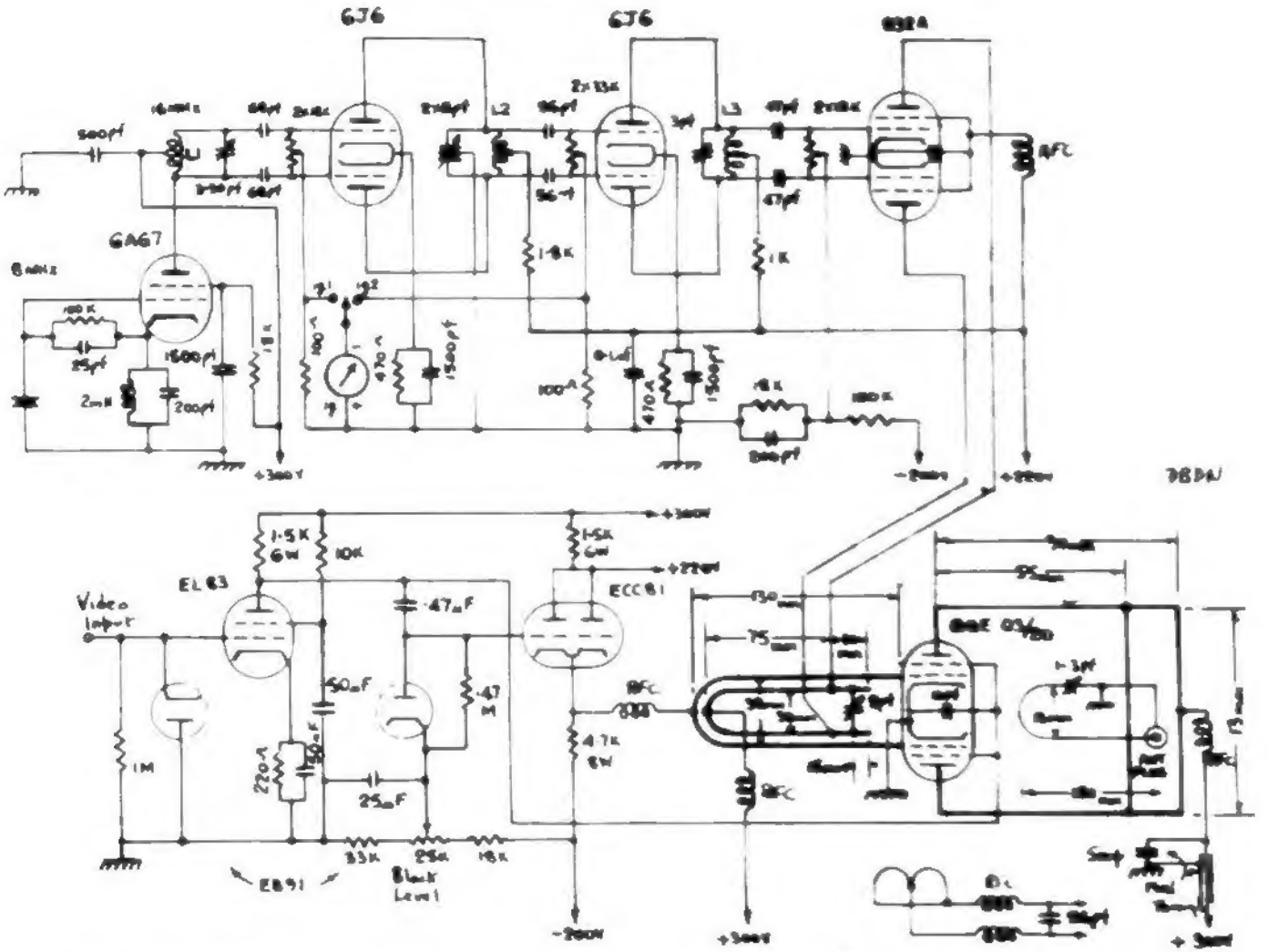


Figure 3: Test set-up for measuring line constants.

A pulse generator or other source of pulses is correctly terminated by R1; a variable resistor VR1 (say 10,000 ohms) is placed in series with the open-ended line, and the CRO is connected across the line input. The pulse width is adjusted until the waveform shown is obtained. VR1 is now altered until the height of the shoulders is equal until the shoulders are of equal height. Under these conditions, Z_o = (VR1 + R1), and 2T is the width in microseconds of either shoulder.

A 70 CM TRANSMITTER

Contributed by Lou Foreman, PA/VT.



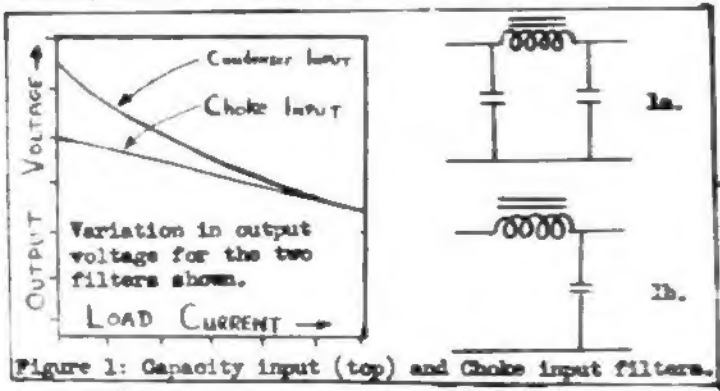
Reproduced above is the circuit of the 70 cm television transmitter built by the Groningen ATV group. This was first put into action last year when the group ran a mobile jeep-mounted TV camera. Its design is typical of present-day amateur working, and combines simplicity with efficiency and economy.

A 6AG7 is used as a crystal oscillator-doubler, followed by a 6J6 trebler to 48 Mc/s, another 6J6 trebler to 144 Mc/s, and an 832A driver on 144Mc/s. The 832A has a parallel line plate circuit, which, as indicated on the diagram, lies close alongside the grid circuit of the QQE03/20 power trebler. Note that the anodes of the 832A are connected at the points 75mm from the end of the loop, the long lines on the drawing merely indicating electrical continuity. No grid tuning is indicated on the original circuit of the QQE03/20, and the plate tuning is done by sliding the shorting bar (indicated 55mm from the anode pins on the diagram).

The modulator accepts a positive composite signal, which is DC restored and fed to an EL83 video amplifier. The anode of this feeds the cathode follower (ECC81), but is also connected directly to the screens of the QQE03/20 so as to increase the depth of modulation obtainable. The DC restorer on the grid of the cathode follower is returned to a potential divider; varying the control adjusts the cathode follower grid potential, and hence its cathode potential, the grid bias potential for the P.A, thus setting Black Level. Remember that this modulator is for NEGATIVE modulation, and for positive modulation both DC restorers must be reversed, and the polarity of the input waveform must be reversed too.

TELEVISION POWER SUPPLIES

For television use, the power supplies must be somewhat more perfect than is the case with sound, or transmitting equipment, and the like. The output voltage of a normal power supply (transformer, rect-ifier, smoothing) fluctuates considerably as the load current varies. With a capacity input filter (see Figure 1a), the reservoir condenser can charge up to the peak value of the AC from the transformer if no current is taken from the power supply unit. As the load increases, this condenser will charge to a lower and lower potential, reducing the output correspondingly. With a choke input filter, the AC component does not reach the condenser, which can only charge to the mean value of the AC. Thus, the no-load output voltage is lower for a choke-input filter, but on the other hand the drop with load current is not so severe. It is said that the "regulation" of the power supply is better in this case. Figure 1 shows the variation of output volts with current for the two cases.



Variation in output voltage for the two filters shown.

Figure 1: Capacity input (top) and Choke input filters.

The output voltage will also change, of course, if the mains input to the supply unit varies, and this type of power supply does nothing to stabilise against mains voltage fluctuation.

A further point not normally considered is that of the output impedance of the power supply unit. With the exception of television units, and some rare special cases, the output impedance of the PSU is of no especial importance. The output smoothing condenser is normally at least 32mfd, and this has a very low reactance even at low frequencies. For television work, however, it must be remembered that frequencies down to zero (D.C) are in theory being used. Since X_o for the output smoothing condenser increases as the frequency decreases, Z_o for the PSU (X_o in parallel with the resistance and inductance of the choke, rectifier, and HT transformer) begins to rise. This can cause a 180° phase shift at some frequency, and as a result VLF oscillations can occur at a few cycles per second.

For any power supply then, there are three things to be borne in mind: (i) the output voltage stability (ii) the output impedance that can be tolerated, (iii) whether mains fluctuations are likely. It is possible to design a power supply that will almost wholly satisfy at least one of the above points, or a compromise can be reached to give reasonable results for all three. As an example, television counter circuits require the HT voltage to remain very steady, but, since the load current is practically constant, a high output impedance is of no importance. On the other hand, a video amplifier HT supply should have a very low output impedance, the voltage regulation being less important.

Consider now the various ways of improving the regulation of a simple PSU. One common method is to use a Neon stabiliser tube, as in Figure 2a. This has the disadvantage that the range of load current over which the tube will stabilise is rather limited, and the precise voltage that is stabilised is subject to long-term drift. Also, of course, the output voltage is not continuously adjustable, and for high voltages several tubes must be run in series. The output impedance of a Neon stabiliser is of the order of at least 20 ohms, rising considerably at quite low frequencies. To improve the HF performance, a small condenser should be joined across the output, care being taken that saw-tooth oscillations do not occur (a 220 ohm stopper in series with the condenser should prevent this).

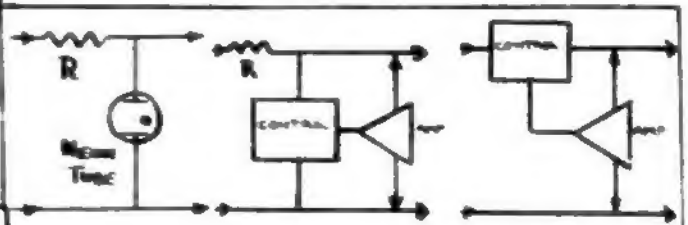


Figure 2: Common Stabilisers; (a) Shunt Neon; (b) Shunt valve; (c) Series valve.

A better method is to replace the Neon by valves in various arrangements. Either series or parallel stabilisers can be used, the former being more efficient and giving a higher output voltage for a given input voltage, since there is no drop across a series resistor to be allowed for. In either case, an amplifier samples the output volts, and feeds a correcting voltage back to the amplifying any changes and applying a correction to the control valve in such a way as to keep the output voltage constant. The design of suitable circuits to cover the three Basic Points will now be dealt with.

Consider a series stabiliser, as shown in outline in Figure 3. Now,

$$X_o \text{ (DC)} = \frac{\text{Change in output volts}}{\text{Change in load current}} = \frac{\delta V_o}{\delta I_o}$$

This change in output volts δV_o is reduced at the

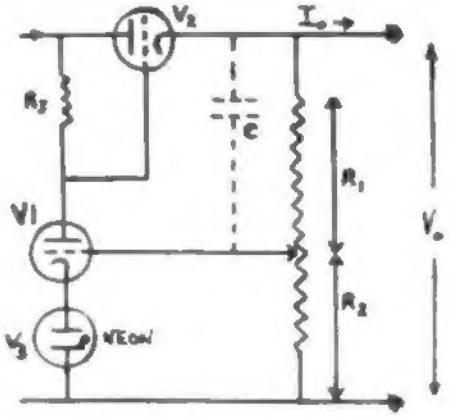


Figure 3: Outline Series Stabiliser Circuit; V1 is the amplifier sampling the output, and V2 is the series control valve correcting the output.

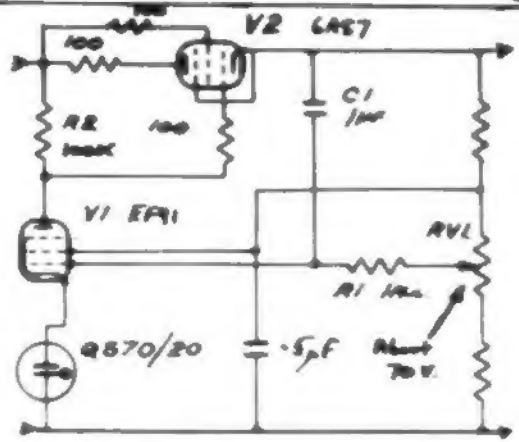


Figure 4: A typical general purpose stabiliser circuit.

grid of V1 in the ratio $\frac{R_2}{R_1 + R_2}$. If g_m for V1 is g_1, its gain is approximately $g_1 \times R_3 = A$, say.

Therefore the change in anode volts at V1 due to δV_o at the output is $\frac{\delta V_o \times R_2 \times A}{R_1 + R_2}$. If g_m for the control valve is G, the change of current through it due to the change in V1 anode volts is

$$\delta I_a = G \times \delta V_o \frac{\times R_2 \times A}{R_1 + R_2} = \delta I_o$$

But $Z_o = \frac{\delta V_o}{\delta I_o} = \frac{R_1 + R_2}{R_2} \times \frac{1}{G \times A}$.

If a condenser is placed across R_1, the effect of the potentiometer chain is reduced, and we have the approximate answer that

$$Z_o = \frac{1}{GA} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (1).$$

Equation (1) gives the first design criterion: for a low output impedance, the controlling amplifier must have a high gain, and the control valve must have a high g_m.

Most textbooks of radio show a series stabiliser circuit similar to Figure 3, but using a pentode as the amplifier. As will be shown, Z_o can easily be a few tenths of an ohm with this type of circuit, but due to the varying current passing through the neon in the cathode circuit, the output voltage stability is not exceptional. Where this stability is essential, it is better to allow a constant current to pass through the neon, and to use the neon as a reference potential only, and not as a stabiliser.

Summarising, then, a power supply can be made to give (a) a stable output voltage;
(b) a low output impedance;
(c) isolation from mains voltage variations.

To get a low Z_o, R3 in Figure 3 will be high, say 100K or so. The stray capacity in the circuit will cause the gain G to fall off at high frequencies, so that Z_o will rise. A condenser is therefore required across the output, so that its falling reactance counteracts the rising Z_o of the stabiliser. 8 mfd is satisfactory here.

Figure 4 shows a typical "all-round" stabiliser. Using an EF91 amplifier, and a 6A57 control valve, Eqn (1) shows that the output impedance will be about 0.2 ohms, and the voltage stability will depend upon the stability of the neon. This in turn depends on the current flowing through it, which is limited by R2; one cannot therefore make the gain of the amplifier very large by further increasing R2 without sacrificing stability. R1 is a high value (1M) so that C1 can be reasonably small and yet still be satisfactory at low frequencies. (Compare the use of large grid leaks with small condensers in video amplifiers). RV1 acts as a fine control on the output voltage. 100 ohm stopper resistors are included in the control valve circuit to prevent spurious oscillations.

Mains voltage fluctuation effects will be greatly reduced by the use of a stabiliser (actually in the ratio Z_o/Z_{in} for the stabiliser), but correct choice of series valve will ensure that the amplifier is not wholly occupied in overcoming input variations at the expense of dealing with output load current variations. For:

$$\mu = \frac{\delta V_a}{\delta V_g} \quad (I_a \text{ constant}) \ldots\ldots\ldots\ldots (2)$$

If δV_a is due to mains fluctuations, the amplifier must supply δV_g to the series valve to correct it. This must be as small as possible so that the total available amplifier swing is not used up in this way, leaving nothing spare for load fluctuations. Now we have another design criterion: for good freedom from mains fluctuations, the series valve should have a high μ.

(To be continued).

THE STATICON

The second class of camera tubes depend on photo-conductive, rather than photo-emissive, effects for their operation. That is to say, when light falls upon the sensitive plate in the camera tube, instead of the plate emitting photoelectrons, it merely alters its electrical conductivity. This phenomenon has been known for many years (e.f Selenium) but until recently has not been of use since the effect has taken time to operate. For this reason, tubes working on this principle have been used mainly for industrial and amateur TV, where slight lag in the picture is of little importance.

In a photo-emissive tube the limit of sensi-tivity is governed by the energy of the incident light, since it is this that causes the electrons to be emitted. The theoretical maximum appears to be about 500µA/lumen, and tubes have been made with sensitivities as great as 1/10th of this, but only at the expense of the colour response.

In a photoconductive tube, the light falling on the plate controls the tube current by varying the target resistance, an action analogous to that of the control grid in a thermionic valve. Sensitivities of 10,000µA/lumen are easily obtained, and this sort of tube is very sensitive. The time lag mentioned above is rather excessive at low light levels, and in practice the sensitivity is between that of a CPS tube and an image orthicon, that is, perfectly acceptable pictures are obtained indoors with normal daylight coming through the window. The name given to this sort of tube is "Vidicon" in the USA, and a similar British tube is the "Stanicon" made by Pye.

Construction of the Vidicon/Staticon:

The Staticon consists basically of an evacu-ated tube, 6" long and 1" in diameter, containing at one end a semi-transparent photoconductive layer a few molecules thick only. The image of the object to be televised is focussed optically upon this photolayer, which is then scanned internally by a narrow beam of electrons generated by an electron gun at the other end of the tube. A wall anode extends the length of the tube, and is connected to a fine screen near the photolayer. Line and frame deflector coils are placed around the tube, the whole being placed in a long focusing coil. A small alignment coil or magnet is used near the gun assembly.

Operation:

Under normal conditions, the electron beam deposits electrons on the target surface sufficient to stabilise it at cathode potential. Under the action of light, the target changes resistance, and some of the electron charge leaks away. The next scan therefore supplies a greater number of electrons, and thus there is a change in beam current. This current is made to develop through a load resistor a varying potential drop, and this constitutes the video output signal. The output

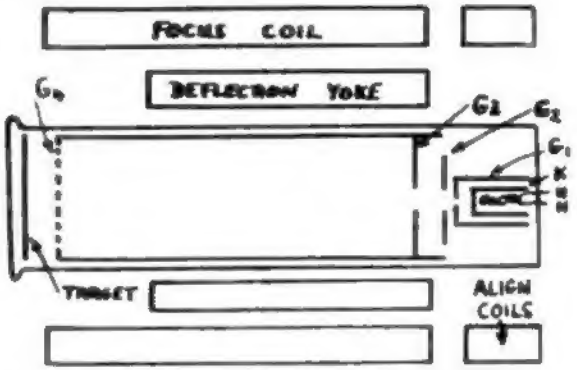


Figure 6/6: Arrangement of Staticon coils.

signal swings negatively for illuminated areas of the target.

The scanning beam is generated by a gun assembly consisting of a cathode, control grid G1, and accelerating grid G2. Focussing is done by the axial magnetic coil, and also by a further grid G3 for fine control. G3 is internally connect-ed to G4 the target screen to establish a a unif-orm electrostatic field between electrode and target. This ensures that the scanning beam is always incident normally upon the target, whatever the deflection condition. If this is not so, there is a severe loss of definition. For the same reason, the target must be very thin, which increases its capacity and HF loss in the video signal.

Typical data for Staticon types C931A & B

Heater: 6.3V @ 0.35A.
Inter-electrode capacity: Target to all other electrodes: 5pF.
Spectral response: C931A resembles orthochromatic film (low red sensitivity); C931B resembles panchromatic film (good red sensitivity).
Target area: for a 4 x 3 aspect ratio, the useful diagonal is 16mm (the tube is designed to use standard 16mm cinecamera lenses).
Operating position: any, except face downwards.
Heater/Cathode volts: +10, -125V. max
Max face temperature: C931A 40 degs C, C931B 60 degs C.
Target volts: 10 to 60V.
G3/G4 volts: 200 to 500V.
G2 volts: 300V.
G1 for cut-off: -45 to -100V.
Normal signal output: 0.1 to 0.2µA.
Blanking: to grid 50V p-p.
or to cathode 25V p-p.
Field at centre of focus coil: 40 gauss.

On account of its small size, low voltage and scanning requirements, this tube is highly recommen-ded for amateur work, and therefore the following setting-up instructions are included for completeness.

AN EVEN SIMPLER FLYING SPOT SCANNER

Alain Decauvel, F9MN, suggests a modified Flying Spot Scanner which eliminates the need for a separate sync generator, and all the vision-sync-blanking mixers, and yet gives out a complete and composite television signal. The system is ideal for a portable unit, or for where the utmost simplicity is essential.

The usual arrangement of units is employed, with the exception of those mentioned above, and the block diagram is given in Figure 1. The trick comes in the slide used in the scanner. This is opaque - a sheet of black paper stuck onto the face of the CRT

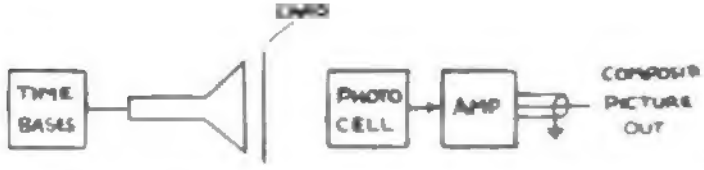


Figure 1: General arrangement of the system.

will do nicely. From this is cut out the callsign or any other silhouette design, making sure that the edges of the "picture" are at least ½" in from the edges of the raster on the CRT. The picture area is now covered with a sheet of coloured gelatine (say from Strand Electric's stock of stage gelatines); the precise colour will depend on the CRT and photocell in use, as will be explained. Next, an L-shaped slit is cut out of the right-hand side and bottom edge of the paper, making sure that the slots are not covered by the gelatine. With the scanner at full brilliance and properly focussed, the photocell ou output will be at three levels, corresponding to paper (no output), gelatine (some output) and slit

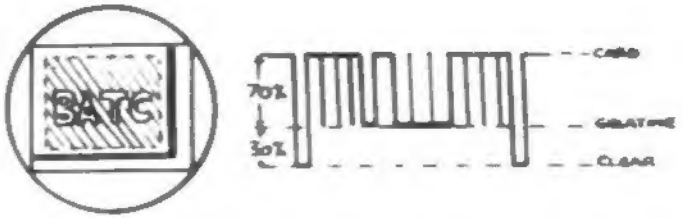


Figure 2: (left) A typical pattern showing the sync slots; (right) a typical photocell output waveform for one line, showing the three levels of output.

(full output). The gelatine must now be selected to make the "gelatine level" 30% less than the full output. Now we have a composite picture of negative polarity, and a phase inverting amplifier will give black letters on a white ground, with syncs "blacker than black" in the usual way. The correct sync pulse widths will be obtained when the side slot is about 1/10th of the total picture width, and the bottom slot should be 1/50th of the height.

The idea is obviously capable of expansion. Blanking can be added by extending the gelatine over a wider slit; other shades of gelatine will give other shades of grey in the received picture, and contrast bars, or half-tone illustrations even, could be built up. Alternatively, a photographic negative could have the slits scraped on its surface; other ideas will no doubt occur to the reader. One great advantage of this system is that the domestic tv set can be pressed into service as a signal source without any modification to it whatsoever, bearing in mind that the CRT in it may not be very suitable for flying spot work.

RSGB EXHIBITION 1954 (Contd from P2).

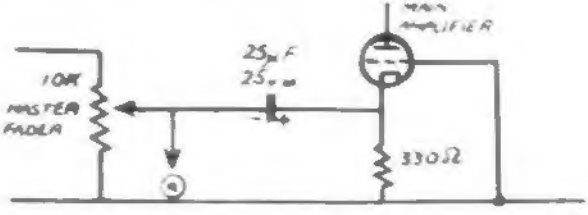
would be useful. Ian's viewfinder had a lens enlarger and an adjustable hood, which was of great value. G2WJ's viewfinder gave a rather small picture, which, combined with the backlash in the focussing control, made camera focussing difficult to determine.

One minor point to do with stand layout was the fact that all monitor screens were rather low, so that with a crowd standing around, only the first row could actually see the pictures.

These points are not, of course, intended as a criticism, but as a help and a reminder for next time. In fact, most of the points were raised by the full-time crew: G2WJ, Jersey, Ian and various friends. A very good show, chaps - congratulations.

• A page of similar hints and tips for exhibitions appeared in CQ-TV No. 14 p.10. Please let us know if some little point occurs to you of this nature - it may help someone else to put on an even better show.

CORRECTION: An omission occurred in the circuits of the Vision Mixer given in the last edition. As shown the unit will only work correctly provided the master fader control is at maximum. An extra coupling condenser and cathode resistor should be included, as shown below. No change is necessary to the Monitor amplifier.



Back Copies: Nos. 21 and 22, and a few 20s, are available from G3CVO @ 1/6d each incl. postage. May we ask you to return any back copies you may have no further use for.

"WHAT THE OTHER CHAP IS DOING..."

By Arthur L. Mattemblooper.

Doug Wheele, your Hon. Sec., has had no less than 75 BATC letters to answer this month - and that does not include the ones not requiring a reply. A healthy sign, but Doug has unfortunately had both exams and domestic illness to cope with, so please be tolerant if mail is delayed. Remember, items for this column should go straight to G3AKJ at 56, Burlington Gardens, Chadwell Heath, Essex. They will also be quite safe if sent via G3EKE or G3CVO, but with delay.

Here is a most interesting letter from G.Wynn, (London SE5), who has just arrived from Canada. He first started over there three years ago with two RCA 1846 Iconoscopes, and sends in some photos of his gear. A tripod carries the camera and viewfinder (having a slight resemblance to the RCA, and Marconi Mk 1 cameras), and at the bottom is the power supply and CRO (permanently?). G.W is now after a Staticon, and wants to proceed to colour work, Grant Dixon please note! In Canada there was also lack of interest in the vicinity, so to date only closed circuit work had been attempted. Mr Wynn leaves that in a very open state now that he is over here. Any London members would be welcome if they would contact Mr Wynn - see New Members list.

Dave Hooper G3ICU (NW10), in between answering queries about Staticons, has started work on a 5FP7 PSS, a 200 line pulser, and power supply. Dave has built the lot into a non-standard 4' rack, which will be available as a complete unit for demonstration use - mains in, PSS picture out (monitor will be separate). Dave also has a Tape recorder based on the Lane Mk III, a Ford 8, and a pair of willing hands!

J.G.Assenheim (N.15) is rebuilding his 5527 camera, and reports that Tony Lobb (Croydon) has his 5527 unit working reasonably well. Both these units are intended for colour work later.

Roy Martyr (Chelmsford) has built a really hot receiver, which has all the refinements, black level clamps, AGC, focus stabilisation etc. With some good test gear available, Roy hopes to receive G2WJ/T as soon as the workshop is completed.

George Goldsmith (Jersey) has obtained a good picture of Test Card C from his monoscope, using common time bases with the 9" monitor, and a lash-up video amplifier prior to rebuilding into a rack. He has rebuilt his pulser for the third time - from Thomasson's design in "Practical Television" to a modification of the Murphy TPG11. George is going for a first class pulse system before pressing on with a camera, etc. He is interested in getting a tube, and also asks that any members visiting Jersey should pop in and see him for a chat.

George Higgins (see Editorial) has just completed a "TV Scope", and nearly finished a BC TV cum ATV monitor; the pulser should be well on the way by Christmas, but progress is slow due to lack of workshop facilities. George has a flat in Manchester but travels home to Bradford once a month, and also visits Nottingham. He's anxious to contact groups in both places.

N.H.Nathan is up at Pembroke, Cambridge, but during the vacations is building a telecine unit using a 5FP7 and 931A, 405 line standard. He wants to meet other members either at home (Broadway, Worcs) or in Cambridge.

J.M.Benyon (Risingbrook, Stafford) is a fan of this page (Hooray! A.M.) and sends in a wrinkle from the RCA data sheet on the 931A. A metal screen round the tube, close to it and connected to the cathode or at least the same potential as the cathode, reduces the effective noise resistance of the 931A by as much as 10 times in some applications, and this, as J.M.B remarks, might be of value in Flying Spot applications.

Ian Ross is feeling left out of things up at Tain in Ross-shire, and he wants to learn something about the camera side of things. He is a good friend of G3ZT/T at Plymouth - who also suffers from lack of local activity. Any chance of stirring up the local VHF enthusiasts, or the camera club? Ian is no less than 140 miles from Kirk o'Shotts, and can only rarely receive a reasonable picture, but has a friend nearby whom he hopes in due course to introduce to ATV.

George Flanner (Birmingham), although still bed-bound, has been able to take the GPO technical exam, and is now licensed as G3KBA/T. Our very best congratulations, George, and we'll hope to see either you or the 9.5mm telecine on the air soon. George expects to have 5 watts on 436.8 Mc/s from the centre of Birmingham. Finance is a bit stiff, so George is most anxious to obtain a 5527 or similar camera tube. (Exchange for details of telecine rig??).

Grant Dixon has been building the optical side of the colour slide scanner, and also has prepared a reading list for new members. He had hoped to pay a surprise visit to Liverpool to shake up Laurie Reid, T.V.Attwood and the gang, but unfortunately at the last moment his wife was indisposed, and the pop trip had to be cancelled. Be warned, though, lads - That Man may pop up at any time!

The TELECINE GROUP (Messrs. G8DUS, 3BLV, 3BYI, 3BBK, 3BBZ, G.Short, R.Sheppard, J.Samson, J.Adams, S.Hannaford, and G.Flanner) seems to be in a state of suspended animation, and we would like to have a volunteer prepared to co-ordinate activity by keeping a file of technical information on telecine problems, and to whom anyone with a telecine problem could write.

The COLOUR GROUP (Messrs. Dixon, Johnson, Lobb, Assenheim, Macwhirter, and Hamilker) also appears to be in a comatose state, with the exception of organiser Dixon, who is going great guns on the colour slide scanner and colour bar generator. Grant is also only too ready to swap information with other CTV types.

CHELMSFORD are holding regular monthly meetings

NEW MEMBERS

H.K.Agarwal	3, Trinity Ave, Westcliff-on-Sea, Essex.
G.L.Ashman	27, Gedeney Rd, Tottenham N17.
J.M.Benyon	22, Highfield Grove, Risinghrook, Stafford.
D.E.Bligh	Hall Farm, Lolworth, Cambs.
P.Burrage	Goldings Lane, Leiston, Suffolk.
G.R.Bussey	30, Clifton Rd, Coulsdon, Surrey.
P.Chastney G3CUG	2, Bull Lane, Dagenham, Essex.
T.Coker Jnr.	74, Rhodesia Rd, Fazakerley, Liverpool 9.
M.Cole	50, Hillside Grove, Chelmsford, Essex.
C.C.Deane	84, Abbotts Rd, Abbots Langley, Herts.
A.V.C.Glanville G3EAU	5, Lower Knole Lane, Brentry, Bristol.
H.Grimbergen PA0LQ	Vondellaan 13, Leiden, Netherlands.
J.Herrring	17, Lancaster Rd, Dollis Hill, N.W.10.
L.H.Huntley G4LW	118, Bradford Rd, Trowbridge, Wilts.
P.W.C.Jago	31, Vogan Close, Woodhatch, Reigate, Surrey.
J.Jones	5, Primrose Row, Uplands, Pontardawe, Swansea, Glamorgan.
K.P.Lee	22, Hillcrest Rise, Cookridge, Leeds 16.
V.C.Leek	47, Baldwyns Park, Bexley, Kent.
F.E.Marshall G2XQ	8, Reap Lane, Weston, Portland, Dorset.
J.R.D.Martyr	57, Second Ave, Chelmsford, Essex.
S.May	56, Highway Rd, Brington, Leicester.
J.L.McLean	72, Wilson St, Middle Brighton, Melbourne Victoria, Australia.
Ian M.Ross	Knockbreck Rd, Tain, Ross-shire.
B.W.Stainton	24, Beaufort Rd, Edgbaston, Birmingham 16.
J.S.Stoole	Harrow Rd, Avondale, Salisbury, S.Rhodesia.
E.M.Walker ZL1AU	Norwood Rd, Bayswater, Auckland, N.Zealand.
H.G.Weston	16, Pitfield Rd, Lee, London SE12.
R.Wickham	49, Hemmen Lane, Hayes, Middx.
K.J.Wykes	The Lane, Hinwick, Wellingborough, Northants.

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Changes of Address:
G.H.Addison G5BAY/T, 4 Hildara Rd, Leicester; J.Plowman G3AST 146, Ashcroft Rd, Luton, Beds; D.P.Nolan, 196 Castellain Mansions, Maida Vale, London W9.

SHORT NOTES

COUNTY CONTACT: No. 3 SURREY.
Messrs. Bussey, Jago, Gower, Hardy, Lobb, Hudspith, Merriman, Perkin, Prowett, Rouse, Seymour, Tebbe, Bugden, Dodman, Thomas, Greensmill (Barking A.R.C.), Hook, Vaughan, Gregory, Harwood, Warner; do you know the members in your area?
Warning: ALPHA Radio, Leeds, keep advertising 955A photocells at very reasonable prices, but will not supply. We should be pleased to hear from anyone who has in fact received a 955A from this firm.
OVERSEAS members, all 60 of you - if you wish to add local pages to CQ-TV, a note to G3CVO will ensure that all copies for your country are routed via yourself.
Will all /T licensee holders please let us know for a "New Licences" column.
Our printers apologise for the clipping which occurred in some copies of the last edition.
May we remind new members that CQ-TV pages which stop in the middle of the text are part of our projected booklet, and not errors.
P.Burrage informs us that almost any CRT will act as a Staticon - see last edition.
G.Flanner (and others) require 5527s.
Mr. W.Hall is now on the Committee.
The next edition will probably be out in March, and will be a small (economy) size.
If you feel you are getting value for money, donations to the Club funds are gratefully received.

on the second Thursday in each month, normally at G3CVO's house. A series of lectures, including one over the air by G2WJ/T, a film evening, and a visit to Marconi's are planned.

ROMFORD group have been busy signing up new members, but hope to start meetings again soon. Any BATCs living in the neighborhood are asked to contact G3AKJ at SKVen Kings 1051. Similarly, SOUTH LONDON members should write to G3HKE, who, with G3PEG, is anxious to start meetings South of the river. QTH: 307 Norbury Ave, SW16.

Now for a few quick ones: Aberdeen Radio Society are still holding the torch up there.... Ron Bassett of Southampton has recently displayed his gear at a local show.... Rex Boyer of Shefford has joined the London Demonstration team..... the Butchers of East Hanningfield (!) are hoping for a telestill unit.... Frank Gostelow is knee-deep in professional TV at Cambridge.... Jim Russell is still QRT at Bournemouth. S.May of Leicester has joined, making the second father and son TV team that we know about.

Staticon Data Dave Hoper 42 Cassolden Rd, Harlesden, London NW10 at the moment has photostat copies of the scanning coil winding data and time base transformers, also some circuit information. Application forms for these tubes (£25 + 5/- BATC handling charge) from either D.Hooper or G3CVO. Delivery 3 wks.

G.Higgins tells us that "Telerad", All Saints, Manchester, have electrostatic 3" DP7 at 5/6d. OK for PSS, but not quite flat faced.
Teh Editor wishes to thank his Staff: Messrs. Steed, Hughes, Reid, Budds and Mrs. Barlow in particular.
Forthcoming Meetings: (Group Secs please report).
Chelmsford: January 13th "Colour Television" by Mr Harris (E.M.I Co).
Feb 10 "G2WJ/T" by G2WJ, over the air.
Mar 10 "Studio Lighting and Camera Optics" Mr D.Fay.
Meetings nominally at G3CVO's house, please confirm beforehand. Bring your own cups.

ALL SUBSCRIPTIONS ARE NOW DUE